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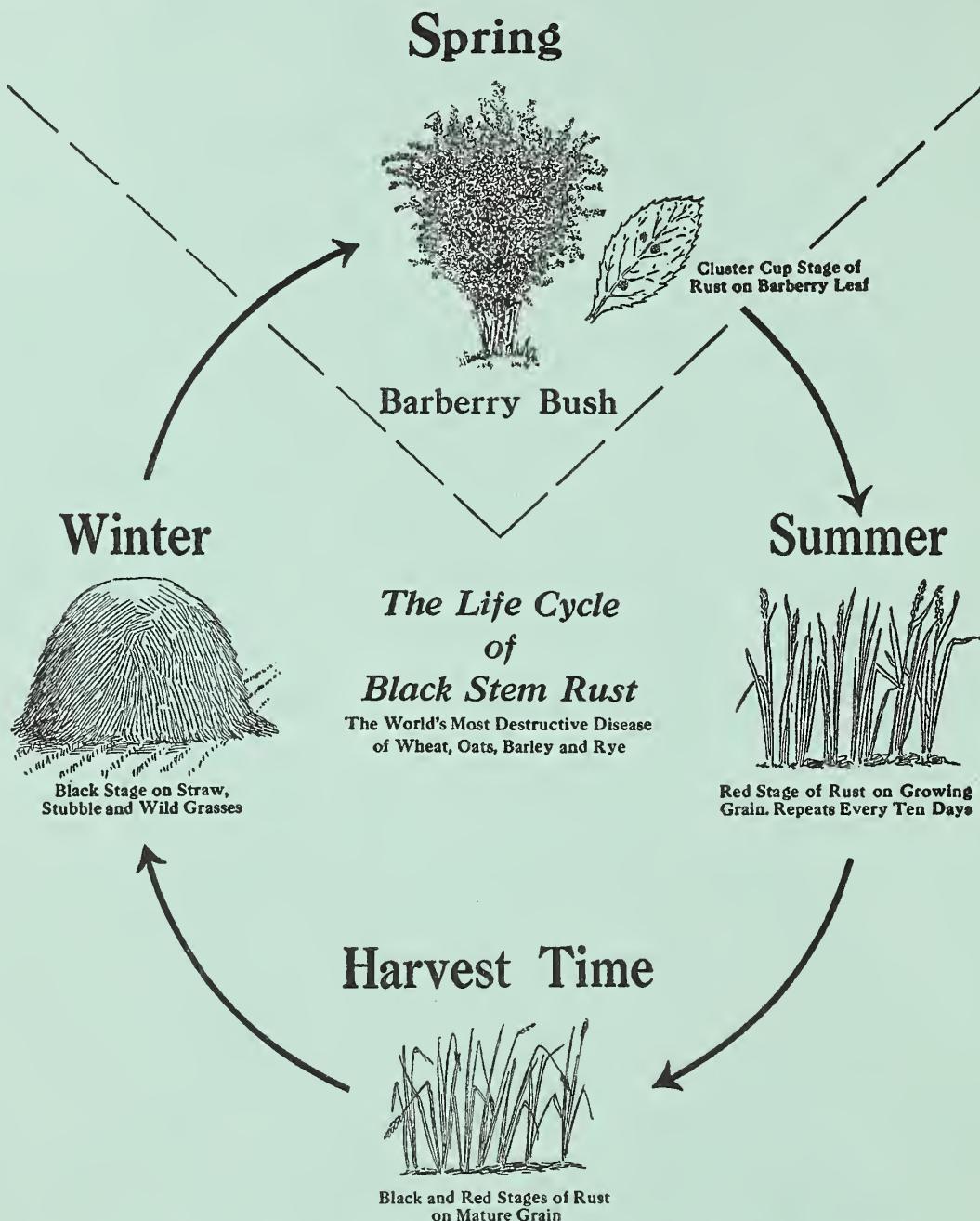
PROGRESS  
*of the*  
Barberry Eradication  
Campaign  
*in*  
Wisconsin in 1930



*Black Stem Rust Spread From This Common Barberry Bush  
To Near-by Grain Fields Causing Severe Damage*

*Barberry Eradication Pays*

# Remove the Barberry and Break the Rust Cycle



All Common Barberries act as starting points for Black Stem Rust early each spring. By destroying the barberry the early spring source of black stem rust is eliminated. The Common Barberry provides a means to bridge the gap between the black stage on grain in the fall and the red stage of the rust on grains and grasses the following spring.

**BOOST BARBERRY ERADICATION—A PRACTICAL RUST CONTROL MEASURE**

## PROGRESS OF THE BARBERRY ERADICATION CAMPAIGN

### IN WISCONSIN, 1930

By Arnold J. Ullstrup\*, Agent,  
Office of Barberry Eradication, Bureau of Plant Industry  
United States Department of Agriculture

#### Introduction

The purpose of the Barberry Eradication Campaign, which is being carried on in the thirteen North-Central States, is to reduce the number and severity of destructive stem rust epidemics, thus decreasing the average annual losses from this disease. During some years stem rust of small grains is widespread, while in other seasons it is more localized. However, there is seldom a year when this disease does not cause serious damage somewhere in this grain producing area.

In the Upper Mississippi Valley, only the black or winter stage of the rust fungus will ordinarily survive the winter months. When the black spores which have over-wintered on old straw and stubble germinate in the spring their tiny colorless spores are blown by the wind to the common barberry, on the leaves of which are produced spores which infect near-by grains and grasses, producing the red stage of the rust. In Wisconsin, the common barberry is a necessary factor for the early propagation of the rust organism in the spring.

As a control measure, the United States Department of Agriculture in 1918, in cooperation with thirteen North-Central grain-growing States, inaugurated a campaign to eradicate the common barberry bush. Since the beginning of this undertaking more than 5,000,000 barberry bushes have been killed in Wisconsin.

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\*Assistant Leader of Barberry Eradication in Wisconsin.

### Sources of Rust in Wisconsin

The common barberry on which the stem rust fungus lives in the early spring, is the most important source of this disease. From the leaves of the barberry bush the rust spores spread to surrounding grains and grasses. These infected plants soon spread the disease to other near-by grains and grasses. Thus the area of infection around a barberry bush may extend over a considerable area. In certain seasons stem rust is far more severe and more prevalent than in other years. The prevalence and severity of black stem rust is influenced to a great extent by temperature and moisture conditions during the spring and early summer.

In the Southern States where mild winters prevail, the red spores will overwinter and bring about direct infection of grains and grasses in the spring. Under such climatic conditions the common barberry bush is not necessary in the life cycle of the stem rust organism. It is known that in certain years stem rust may be carried from the South into the grain growing regions of the Upper Mississippi Valley by air currents. This so-called wind-blown infection is of little importance in Wisconsin since it usually arrives too late in the growing season to cause any serious damage.

### Other Means of Stem Rust Control

Barberry eradication is undoubtedly the most immediate and most effective means of reducing black stem rust losses in Wisconsin. However, other means of control should not be overlooked in the battle against this troublesome disease. Avoidance of low, poorly drained land, proper preparation of the seed bed, application of fertilizers, and in fact, any cultural practice which will hasten the ripening of the crop will help in reducing the damage caused by black stem rust. There are many varieties of small grains which are more resistant to this disease than others. Where these varieties are found to meet the requirements of a given region

with respect to yield, quality, and resistance to other cereal diseases, they should be grown in place of the less resistant varieties.

Results That May be Expected of Barberry Eradication

It is generally known that grain fields adjacent to common barberry bushes are the most severely affected by black stem rust, and that the degree of infection decreases in direct proportion to the distance that the grain is located from the rust-spreading bushes. It is quite evident that the destruction of the common barberry will result in considerable local relief from rust, while on the other hand, stem rust control over the entire barberry eradication area can not be expected until this area is comparatively free from common barberry bushes.

Common barberry bushes must be destroyed in order that our future grain crops may be safe from the ravages of black stem rust. Barberry bushes are known to have been growing in Wisconsin for about 75 years. At the present time they exist in great abundance in many parts of the State, due to the fact that they propagate quite rapidly. If the barberry bushes that are now growing in Wisconsin were allowed to remain, it would be only a short time until these bushes would be generally distributed over the entire State, and the profitable production of small grain would be seriously handicapped.

Recent investigations by the Canadian Rust Research Laboratories at Winnepeg and by Dr. E. C. Stakman, and assistants at the University of Minnesota, have shown that new virulent forms of stem rust may be produced by the cross-breeding of two forms of stem rust on barberry leaves. These new strains of black stem rust may appear at any time, and may by virtue of their origin attack heretofore rust-resistant strains of small grains.

Thus it is clear that the eradication of the common barberry bush may be expected to bring about a threefold accomplishment: (1) a marked reduction of stem rust damage; (2) the protection of future small grain crops; and (3) the elimination of the possibility of new forms of the rust fungus being produced on the barberry.

#### Other Rusts That Attack Grain Crops

Although black stem rust is the most serious rust in Wisconsin, there are several others that attack small grains. One commonly known as crown rust of oats is recognized by its bright orange red pustules on the leaves of the oats. This distinctive orange color persists through the early stages of the development of the crop but changes to a lustrous black upon maturity of the grain. Crown rust attacks only oats and frequently causes considerable damage to this grain in southern Wisconsin. This latter rust is spread by the buckthorn bush in a similar way that black stem rust is spread by the common barberry. Buckthorn bushes are found in abundance in the southern part of Wisconsin, both in cultivated and wild habitat. Leaf rusts of barley, wheat, and rye are common in Wisconsin but the losses caused by these rusts are much less severe than those caused by black stem rust. None of these rusts, crown rust of oats or the leaf rusts of wheat, rye, and barley, have any relationship to the common barberry, and the eradication of the latter will not protect grain crops from them.

#### Financing and Support of Barberry Eradication

In the State of Wisconsin funds for the campaign are furnished chiefly by Federal appropriation. The State Department of Agriculture and Markets supplies a small

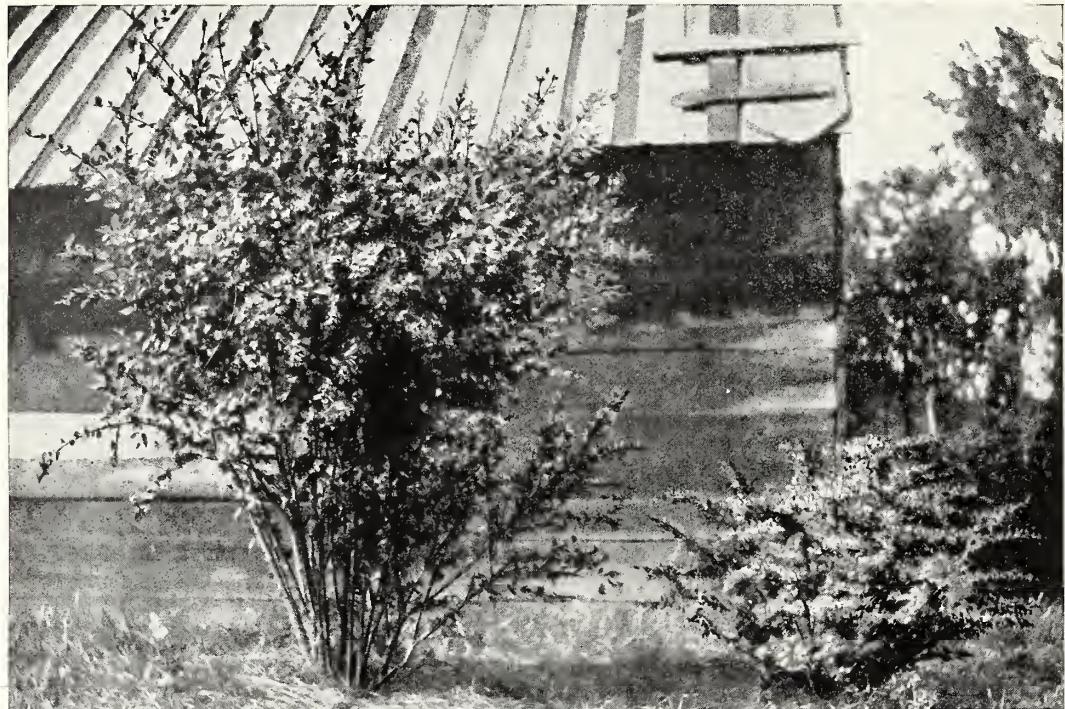
# Black Stem Rust

spreads from Common Barberry Bushes  
to Wheat, Oats, Barley, Rye and many  
Grasses



Black stem rust of small grains is caused by a tiny parasitic plant. In the Northern States it lives for a time each spring on the leaves of common barberry bushes. The dust-like spores of the rust are spread by the wind for miles from barberry bushes to grain fields and from one grain field to another. Warm, moist weather aids the rapid development and spread of stem rust, just as the growth of corn, wheat, or other crops is affected by favorable weather conditions. Destroy common barberry bushes and reduce losses from stem rust.

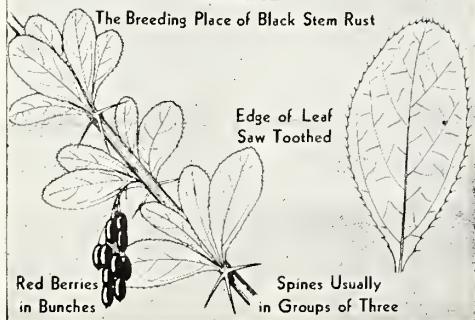
# Learn to Know Common Barberry



## COMMON BARBERRY

HARMFUL

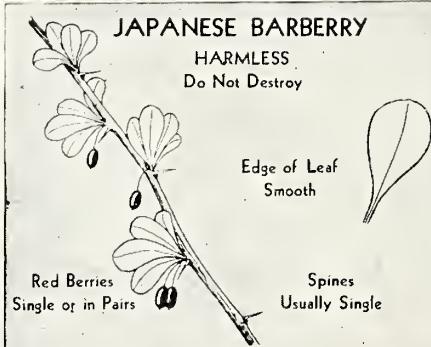
The Breeding Place of Black Stem Rust



## JAPANESE BARBERRY

HARMLESS

Do Not Destroy



Report common barberry bushes you may find, to the Barberry Eradication Office in your State, your Agricultural College, your State Department of Agriculture, or the Barberry Eradication Office, United States Department of Agriculture, Washington, D.C.

appropriation which is administered through the Division of Insect and Plant Disease Control. The College of Agriculture of the University of Wisconsin and the State Farm Bureau Association also render both material aid and cooperation.

The Conference for the Prevention of Grain Rust, located at Minneapolis and composed of agricultural and business leaders, has been active in rendering assistance to the barberry eradication campaign.

Organization and Personnel of the Barberry Eradication Forces

The Barberry eradication campaign in Wisconsin is in charge of a Federal Leader whose office is located at Madison, Wis. Office facilities are provided by the Division of Insect and Plant Disease Control of the Wisconsin State Department of Agriculture and Markets.

The field agents in barberry eradication are employed for a period of from four to six months during the spring, summer and fall. These men are selected almost entirely from those having received training in a college of agriculture, or are enrolled at present in an agricultural college. Men making a satisfactory school record and having considerable farm experience are preferred for this work. Before entering the field the men are given instructions in methods of survey eradication.

During the past season 26 field agents and 10 local laborers were employed in Wisconsin by the Federal Department of Agriculture. The local men were divided into two squads, each of which was in charge of an experienced squad leader. Although the policy of employing local laborers is practically new in Wisconsin, it has been very successful during the past season. However, it seems advisable to confine the employment of local help to areas where barberry bushes are numerous.

Methods of Survey and Eradication

The field agents were divided in squads of six men each. Each group was under the direction of a man who was directly responsible to the Leader in Charge for thoroughness of the survey of territory to which the squad was assigned.

This system of organizing the field agents has been effective in Wisconsin where large tracts of native timber were surveyed, or where barberry bushes were numerous. The men walk five abreast at a close enough interval to insure that no bushes are missed. The squad leader follows his men to check their work and insure thoroughness.

Digging and grubbing out barberries was the method of eradication used when the campaign was first initiated. However, this slow and inefficient method was replaced by the use of common salt. The latter method is very effective in killing when the salt is piled around the crown of the bush in sufficient quantity. Digging, however, must be resorted to when barberry bushes are found growing close to valuable shrubbery that would be killed by salt.

Progress in Previous Years of Barberry Eradication

Barberry eradication was begun in 1918 when the war demanded a maximum production of foodstuffs. The object at that time was to eliminate the common barberry as rapidly as possible in order to prevent such serious stem rust epidemics as had occurred in 1916.

When the campaign was initiated a first survey was planned by which all city properties and rural farm sites were hurriedly inspected. During this survey, lasting until 1924, more than 3 million common barberry bushes were destroyed over the entire State. In the more recently settled districts of the State this survey prevented the escape of bushes from cultivation which materially reduced the amount of work that would have been necessary had the program been delayed by a more intensive survey.

Before the first survey was completed it was evident that the common barberry had escaped cultivation in large numbers and was growing wild in practically every type of uncultivated land.

As a result of these findings a second and more intensive survey was begun in 1924, which was designed to provide for a more thorough inspection of woodlots, fence rows, roadsides, and any place where barberries might be growing. To date more than 300,000 bushes and seedlings have been eradicated on this second survey.

Along with survey and eradication an educational program has been conducted with the object of teaching the public the purpose and necessity for barberry eradication. This educational campaign has been carried on through the schools, the press, and by special talks and demonstrations. Work of this nature has met with very favorable cooperation, and people are becoming acquainted with the campaign and the results that may be expected when it is completed.

#### Barberry Eradication Activities in 1930

The object of the eradication campaign in Wisconsin in 1930 was to concentrate the activities in heavily infested areas. The squads began work in locations where barberry bushes were in greatest abundance and worked out in all directions from the apparent center of the escaped area. Before leaving an area infected with common barberry bushes, the field agents were required to work at least two miles from the last barberry bushes found on all sides of the area in which activities were in progress. In some cases it was possible to establish a two-mile boundary of barberry-free country around the area, whereas, in other locations barberry bushes were continually being found as the work progressed.

The field activities of 1930 were begun in June in Dane County with two squads each consisting of 6 men. Ten

of these men were local laborers living in the vicinity where the eradication was performed. The men were under the supervision of two experienced squad leaders who directed the field activities. During the season 21,107 bushes and seedlings were destroyed in Dane County, all of the work being centered in the Black Earth area of escaped bushes.

By June 24 the barberry eradication force consisted of 37 field men working in 5 different regions. The activities were limited to Dane, Rock, Green, Jefferson, Ozaukee, Iowa, and Dodge Counties. Rock County is nearly completed by second survey except for a portion of Plymouth township.

In Green County a relatively small "escaped area" was completely surveyed, the work being confined to Cadiz township where 821 bushes and seedlings were destroyed.

The activities in Jefferson County were limited to Aztalan, Farmington, and Jefferson townships. During the season 4,744 bushes and seedlings were killed in this area. Progress in this territory is rather slow due to the fact that bushes are found growing in thick tamarack swamps that make scouting very difficult.

In Ozaukee County 5,137 bushes and seedlings were killed by salt or by digging. This county was one of the earliest to be settled and barberry bushes have been growing there for a great many years. Some of the largest bushes in the entire State have been found in this county.

In Iowa County the season's activities were confined to an area in Wyoming township where 4,768 bushes and seedlings were eradicated. The very rough and rocky hillsides in this territory furnish an ideal seeding ground for the common barberry.

After completing their assigned territory in Rock County a squad of six men was sent into an area of escaped barberry bushes in Dodge County. Here 1,208 bushes and

# COMMON SALT KILLS BARBERRY BUSHES AND PREVENTS SPROUTING



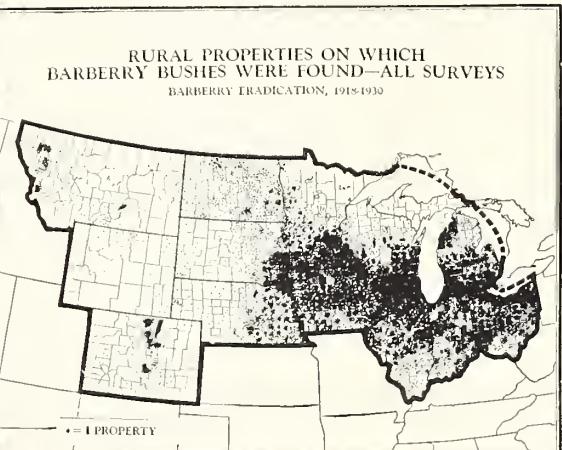
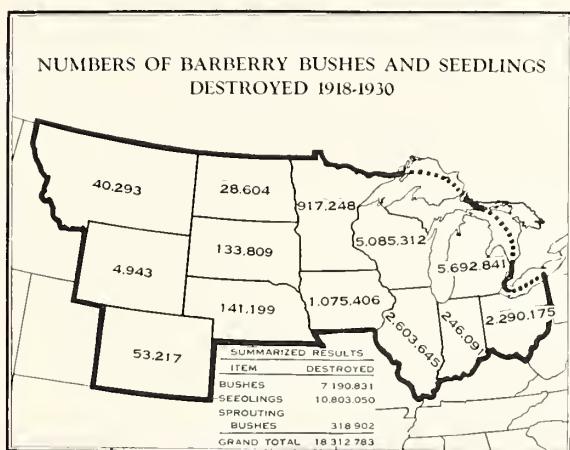
SALTING A BUSH



SPROUTS FROM DUG BUSH

Birds, animals and man chiefly are responsible for the wide distribution of the seeds of common barberries. Every fence row, thicket, pasture or wood is a possible hiding place for these bushes.

Every man, woman and child should consider it his or her duty to look for and report common barberry bushes.



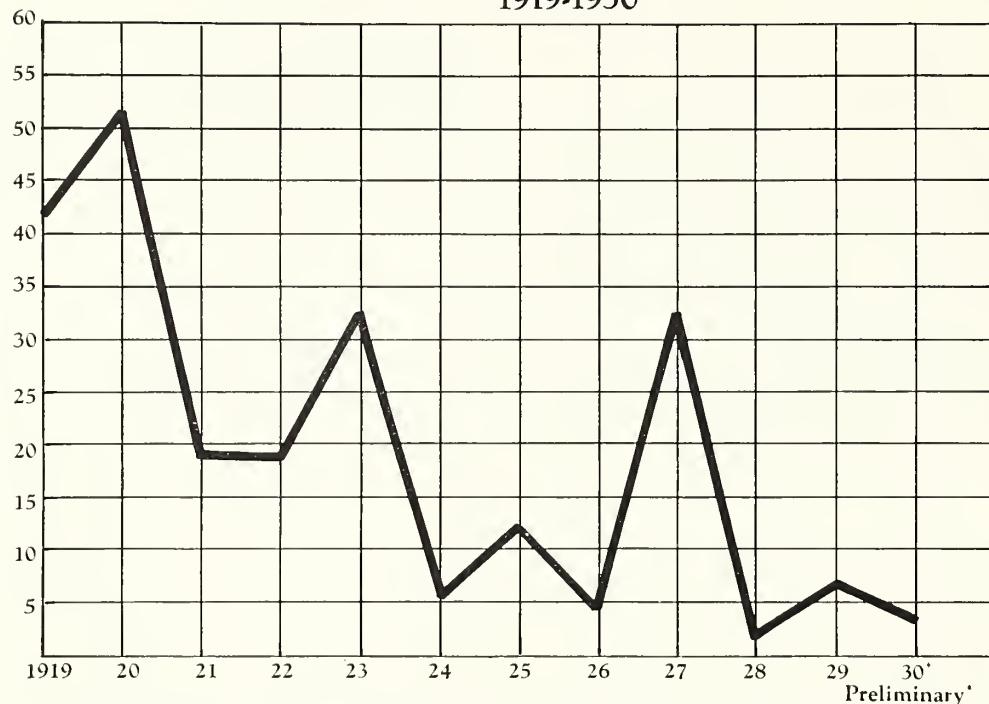
More than 18 million sources of black stem rust were removed 1918-30

Prepared by the Rust Prevention Association, 300 Lewis Building, Minneapolis, Minn., in co-operation with Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D.C.

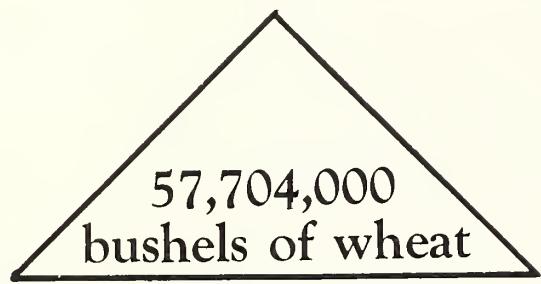
# Barberry Eradication Pays

In Millions  
of Bushels

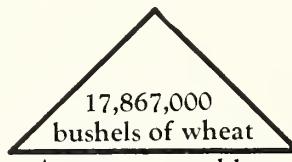
Wheat losses in Barberry Eradication Area  
1919-1930



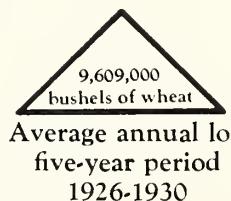
The losses to small grain crops caused by black stem rust have been reduced since the beginning of the barberry eradication campaign in 1918. The breeding of rust-resistant varieties, the use of early maturing varieties, and the sowing of crops early, have aided in this reduction.



Average annual loss  
five-year period  
1916-1920



Average annual loss  
five-year period  
1921-1925



Average annual loss  
five-year period  
1926-1930

Millions of bushels of oats, barley and rye also are damaged each year by black stem rust

Rust shriveled grain always is discounted

Destroy all Common Barberries—Reduce Losses from Stem Rust.

Receive the Highest Available Price for Grain.

seedlings were killed. The topography of this county is gently rolling, making for ease in covering the territory.

Practically all bushes and seedlings found during the season were killed with salt, more than 90 tons being used. In a very few instances it was necessary to dig bushes because they were growing in dooryards or near valuable plants and shrubbery.

#### Rust Conditions in 1930

In general, the small grains and the grasses in the State of Wisconsin suffered a relatively small amount of damage from black stem rust in 1930. Stem rust was first observed on rye and redtop on June 14. Fortunately, weather conditions this year were not as favorable for the development of stem rust as they have been in some previous years. A small amount of stem rust damage was suffered by spring wheat, winter wheat and late oats. From observations made by the Barberry Leader and field agents it was quite evident that stem rust was more severe in the southern half of the State where barberry bushes are most abundant.

Crown rust of oats was quite prevalent this year in the southern counties of the State.

Wheat, barley and rye were also attacked quite seriously by leaf rusts this year. These rusts are distinguished from black stem rust in that the infections are a bright orange in color and are generally circular in shape rather than oblong as is the outline of stem rust infection. These leaf rusts do not cause the serious damage that black stem rust does in Wisconsin.

#### Future of Barberry Eradication

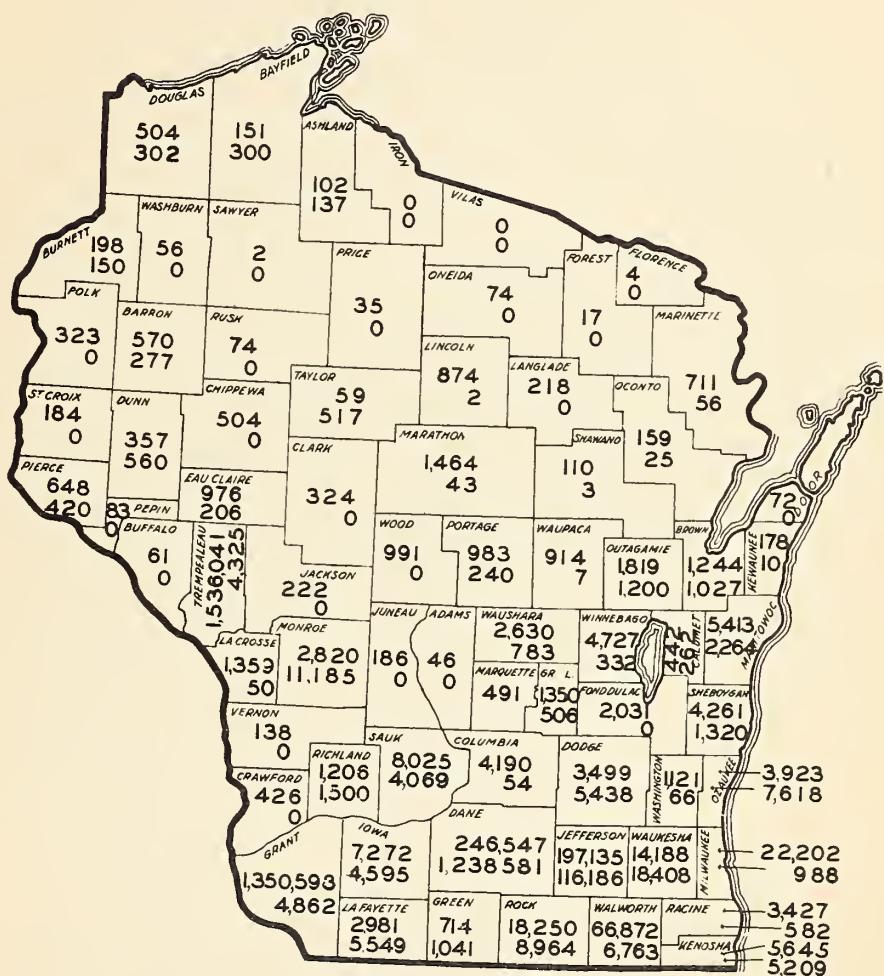
Barberry Eradication has a threefold purpose, namely:

(1) to reduce losses caused by local stem rust spreads; (2) to eliminate a breeding place (the barberry leaf) for new forms of stem rust; and (3) to protect future small grain crops from stem rust damage which would be unavoidable if eradication were delayed and the common barberry allowed to increase unhindered.

Because of the large number of bushes in the State, barberry eradication is a long-time project, and cannot be brought to completion except by intensive effort over a period of years. It is essential that the campaign be carried to completion as rapidly as possible in order that not only Wisconsin's grain crops may be protected but also those of surrounding States where large quantities of small grain are produced.

## NUMBERS OF BARBERRY BUSHES AND SEEDLINGS DESTROYED, 1918-1930

## WISCONSIN



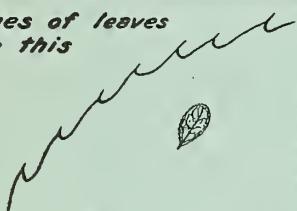
UPPER FIGURE = BUSHES DESTROYED..... 3,535,421  
 LOWER FIGURE = SEEDLINGS DESTROYED..... 1,457,155  
 SPROUTING BUSHES (NOT SHOWN)..... 92,736  
 GRAND TOTAL..... 5,085,312



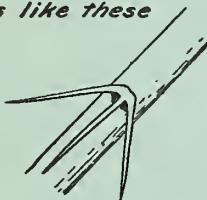
# Common Barberry Spreads Black Stem Rust

When you find  
a spiny bush  
with-

Edges of leaves  
like this



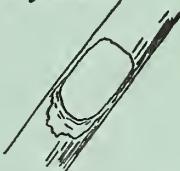
Spines like these



Berries like these



Inner bark yellow



It is a  
Common Barberry  
and should be  
reported at once

Spread of  
Barberries by  
birds

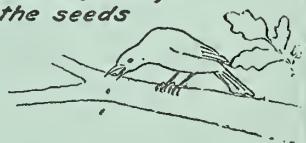
Birds eat the  
berries



Carry them to their  
roosting places



Where they cough  
up the seeds



From which seedling  
bushes grow



They in time  
bear fruit which  
is again carried  
farther on

## Look For and Report All Common Barberry Bushes

To the Barberry Eradication Office, in care of your State Department  
of Agriculture or your State Agricultural College

# Common Barberry Bushes

*spread*

## *Black Stem Rust*

*to*

WHEAT, OATS,  
BARLEY, RYE,  
*and* Many Wild  
Grasses

THIS Study Guide is prepared and printed by the Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D. C. The cover is furnished by the Conference for the Prevention of Grain Rust, 300 Lewis Building, Minneapolis, Minnesota.